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Complexity Mapping and Mess Mapping Tools for Decision-Making in Transportation and Maas Development

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One of the biggest challenges in large industrial corporations is to create commitment and support decision-making in R&D especially in the multi-stakeholder development cases that include a high degree of technology. This article is sharing hands-on experience around developing service design tools of Complexity Mapping and Mess Mapping™. Complexity Maps are made for complex problems and the Mess Maps™ to comprehend wicked problems. These are both participative, co-design and strategic tools for industrial collaboration focusing on public-private partnerships and/or collaborations with multiple stakeholders. These tools focus on scaling up the development of complex systems in transportation and in Mobility as a Service. The article makes a literature review about Complexity Mapping and Mess Mapping™ and then analyses these tools against each other to improve the role of designer in the mapping process. The conclusion is that service designers, artists and designers play an important role in visualizing and intermediating a Complex- or Mess Mapping™ processes. The connections that can be found in the maps will help the companies or entities to take better next steps in their strategies. The article suggests more future studies of mixed methods of Qualitative- and Quantitative Complexity Mapping and Mess Mapping™.

Keywords: *complexity mapping, mess mapping, service design, and strategic design*

Introduction

Decision-making is always challenging for large companies and when the problem setting is more complex the more difficult it is. Complex problems are challenging, but wicked problems are even more complicated to understand and try to solve (Rithey, 2013). In strategic design it is common to make new tools to help the decision-making (Boyer et al. 2011). Often existing tools are modified and done to serve some specific purposes of a service design project like Mobility as a Service and transportation in the cases introduced in this paper.

Transportation or Mobility as a Service can be viewed as a complex problem or a wicked problem. The complexity rises, when more stakeholders are involved and they don't agree what the problem setting is (Head & Alford, 2008). Also, the values of the stakeholders don't come across with each other in a wicked problem setting (ibid.). Wicked problems are unsolvable and often a new wicked problem is created, when trying to fix one (Ritchey, 2013; Rittel & Webber, 1973). For this reason, according to the theorists, it is not possible to solve a wicked problem, but it is possible to tame it (ibid.). How to create less negative impact can often be taken as a focus when treating wicked problems.

The article is using a literature review to explain what is strategic design and how it can be used to create tools to support decision-making. Also, new tools help to define the aims and strategy. The goal of the literature review is to extended the understanding of Complexity Mapping and Mess Mapping™ tools. How can these two tools create understanding of a company's challenge and support in defining and developing company's strategy? How can mapping tools create commitment in service development processes and strategic positioning? Commitment is necessary to manage service design processes successfully. Committed team creates a successful implementation process for the

planned tasks and concludes them. This kind of process creates return on investment for the service design work and Mobility as a Service design work.

The article uses hands-on development work of the Qualitative Complexity Mapping in transportation service design when creating new concepts with a large transport vehicle manufacturer together and one European urban city. Here the University of Lapland and the authors were using their service design knowledge in a form of service design workshops to create strategy and commitment with this large manufacturer. The Mess Mapping™ is still in a conceptual state and it is developed further as a method yet it will be used to create understanding the transportation as a wicked and complex problem and frame Mobility as a Service as a larger concept. This knowledge and outcomes of the paper can be applied in for example designing nation- or province wide service concepts and applications for transporting goods and people. Sometimes a wider perspective and holistic understanding is needed to discover the main pain points or to identify which organizations or stakeholders are relevant and have an influence on pain points.

Objectives of this article is to:

- Support decision making in complex or wicked problems by creating holistic understanding of the problem through Complexity Mapping and Mess Mapping™
- Understand the need for strategic design to create new tools or adapt old ones
- Introduce adapted Complexity Mapping and Mess Mapping™ templates used in cases of transportation and Maas services
- Get to know the differences of Complexity Mapping and Mess Mapping™
- Understand the need for user- and stakeholder centred participatory design in doing the maps in order to create commitment in decision making
- The role of service designers or artists to mediate the process and visually aid the map making

Strategic Design

Past years design has expanded from creating concrete tangible products to modelling decisions, that needs strategic design (Boyer et al. 2011). For Boyer, Cook and Steinberg (2011) think that strategic design is about creating new tools to shape better decisions. Authors continue to explain that strategic design is a form, how to define aims and how to reach them. Design is about challenging the current realities, making new realities possible (ibid.).

Planning is all about decisions and design provides or creates tools for decision-making or problem solving processes. For Meroni (2008) strategic design isn't only about solving problems, but also understanding problem setting like how to raise new questions before trying to comprehend how to solve them (ibid.).

Anna Meroni (2008) has written a paper that brings a reflection about the foundations of strategic design. According to her strategic design discipline is construct above eight pillars:

1) Strategic design is about Product Service Systems;
2) It is also about evolution – strategic design projects should result in a breakthrough, which itself contributes to evolve the system;
3) Problem solving and problem setting – what to do and how to do it;
4) Social innovation – works on the basis of a hypothesis, how a vision can shape future;
5) Scenarios' Building;
6) Co-designing – collaboration from different parties;
7) Strategic dialogue;
8) Building capacities – contributing to change.

(Meroni 2008)

Meroni (2008) concludes her paper explaining that strategic design is about how to set a problem and how to resolve it in an insecure context. Today governmental institutes, enterprises, consultancy firms, let alone companies can benefit from it (ibid.). Strategic design is also a powerful tool for innovation creation. In recent decades innovations have become more and more important for businesses, governments as well as for social planning (Paradis and McGaw 2007; Meroni 2008). Those, that aren't developing innovations, are easily overrun by others´ (Carlopio, 2009; Paradis and McGaw 2007). Ultimately according to Mintzberg (2015), strategy is about creating value, which is also the same goal that service design has (Sangiorgi 2013). A good strategy is focused on what it wants to achieve (Mintzberg 2015).

Complexity Mapping and Mess Mapping are tools to create understanding of a problem setting or of a certain theme (Horn & Weber, 2007). They are larger than mind maps and they help stakeholders to form knowledge of a problem setting. To understand a problem or the relation of various problems together is essential to know how to make smart decisions and decision making itself is about creating strategy (Boyer et al. 2011; Meroni, 2018). These tools work best in the beginning to map a problem of a process of making a larger journey of creating a product or a service. Besides creating understanding they are tools to create empathy too.

Complexity Mapping

Strategic design is also about creating new tools to create holistic understand of a problem and identify the tasks and goals for the design process. Complexity Mapping is a tool to understand a problem setting (Liebovitch, 2014). It is also a tool that helps to communicate a complex problem or a situation (ibid.). Often storytelling is a way of communicating the map in a visual way:

> *"These methods are storytelling in a visual way and provide a richer way (qualitatively different, more complete and helpful) to grapple effectively with complexity and complex systems that can be more comprehensive, clarify interconnections and patterns and show the dynamism of the system possibly suggesting helpful interventions." (Introduction to the Mapping and Visualization Theme, 2014, p. 2)*

Designers often have a role and abilities in visualizing problems through maps in a complex and wicked project (Suoheimo, 2016). They also are creative to think differently and suggest unconventional ideas that could work (Blyth & Kimbel, 2011). These ways having artists and/or designers in a wicked or complex problem setting are important (Blyth & Kimbel, 2011; Suoheimo, 2016). Complexity Mapping is a tool that is familiar to many academic fields (Lee, 2003; Rodriguez-Toro et al., 2004; Samy and ElMaraghy, 2012) and has been applied for example: in biology (Wang et al., 2017); in engineering (Samy and ElMaraghy, 2012); in computational information sciences (Liebovitch, 2014), in management or organizational studies (McKenna, 1994; 1999); financial planning (Battiston et al., 2016); in psychology (Axelrod, 2015) or in physics (Toomey 2014) as some examples. Familiar to all the fields the map is the visual way of presenting and communicating the problem setting.

The tool is extremely versatile and can be applied and modified to various situations and to service design in the cases of this article. Roughly these maps can be divided into three different categories: qualitative, qualitative & quantitative, and quantitative (Straw, 2014). Common tools for Qualitative Complexity Mapping are sticky notes in a board, PowerPoint type of presentations or programs like Vue, Insight Maker or Kumu (ibid.). Normally it is a participative way of making the map, which enables involving stakeholders (ibid.). Quantitative methods concentrate mostly on gathering often computerized big data and putting it into a form of a complex map for example how Liebovitch (2014) used it in analysing information from Twitter. The mixed method uses and mixtures both qualitative and quantitative methods in the Complexity Map (Straw, 2014).

Newer trends in Complexity Mapping are the involvement of artificial intelligence (Liebovitch, 2014). It will be interesting to see how it can capture information in a qualitative way and showing it in a Complexity Map. As the artificial intelligence gathers the information online, for example, it doesn't require a multidisciplinary team as it works alone.

Service design tools: Complexity Mapping for transportation services

Complexity Map template was created as a tool to contextualize and help in creating a roadmap in a complex technologically oriented service situation such as a testing for autonomous transportation service development. It was developed for a workshop held with one European city and a large transportation vehicle manufacturer. This development process took place through two iterations. The Complexity Map was first tested in a local workshop that aimed to develop autonomous platoon truck driving in Lapland. This workshop was part of Autonomous Truck Platooning Challenge (ATPC) project funded by Lapland regional authority and managed by University of Lapland. Authors were involved in project management and research. The first iteration of the Complexity Mapping was aiming at recognizing relevant stakeholders, organisational tasks, legislation and operational responsibilities in autonomous driving test that would be located in city centre.

The Complexity Mapping took place through using simulation of the autonomous driving test located in the city centre. Simulation was based on large benchmark and set of expert interviews carried out by service design master students. Based on these outcomes the student group simulated the infrastructure and actions taking place in the situation through roleplay. The roleplay was analysed and Complexity Map was drawn in the interactive board at the same time. As an outcome of the roleplay there is more information about the stakeholders, the simulation participants are more committed in the development process. The feedback from this first iteration was used to the second one development for European city and a large transportation vehicle manufacturer.

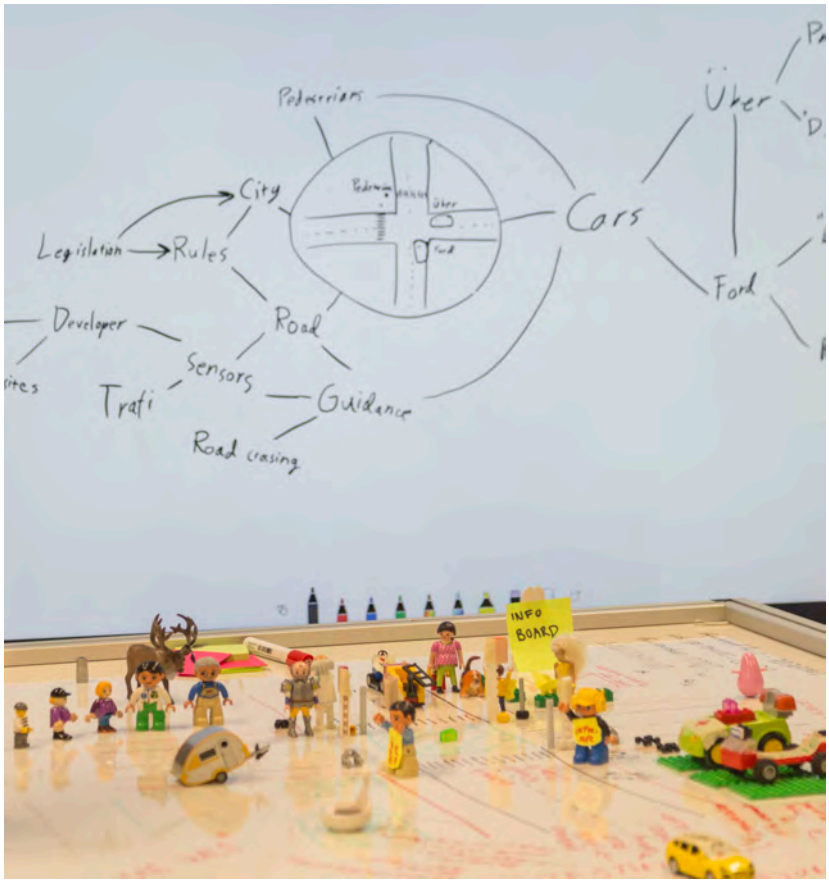

Figure 1 Using simulation to create a Complexity Map

The second iteration was done by the authors using the Complexity Map in a context of service design for public transportation and mobility planning in urban city context. In this workshop, the first day was used to empathize with the users of local transportation system from a perspective of three persona groups. On the second day, the findings were

discussed and shared in three ideation and development workshops. One of the workshops was about using Complexity Mapping for strategic planning of the public transport services.

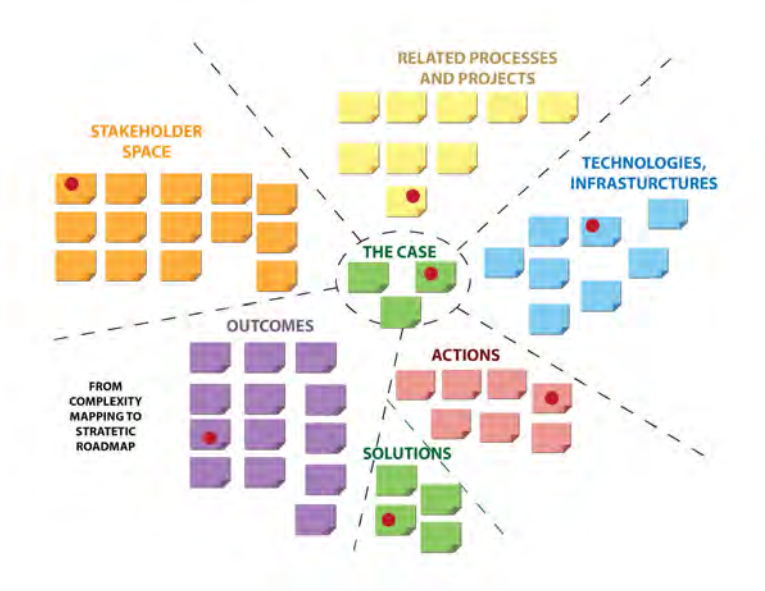

Figure 2 'Template of Complexity Mapping used during the workshop (Source: Developed by Satu Miettinen, illustration made by Mari Suoheimo)'

In the second iteration round Complexity Mapping was used to identify not only stakeholders in general but also internal projects and processes that could contribute to discovering opportunities and resources to implement the proposed case. The case identified in the centre of the map was based on the fieldwork carried out the previous day. The fieldwork helps to identify the stakeholders, related processes and projects, technologies and infrastructures, actions, solutions and outcomes. Depending on the outcomes of the fieldwork the themes could be justified to be very case sensitive and contextual.

The map also helped in creating additional solutions that would support the case implementation. The outcomes could be used to create an implementation task list and strategic roadmap. The template of Complexity Mapping in Figure 2 used was to help the groups to define what are the strategic issues and problems to be understood. Each post-it note presented one of the issues. Identifying the issues on a post-it notes made it easier to cluster the notes in the correct category. In the end of the session, the group could prioritize and create a task list on the issues that are the most important ones by placing red stickers on top of the notes in each category. Creating the commitment and ownership in the project is one of the keys creating a successful development case. Further, it allows the R&D team to identify and cluster the direct and indirect stakeholders relevant to the case. It enables the development team to identify customer journey as well as development phases before, onsite and after the testing.

As an outcome Qualitative Complexity Mapping method for Service Design can be identified: 1) Research phase including benchmark, expert interviews and participatory observation, 2) Using simulation or ideation to identify the case study, 3) Creation of a Complexity Map that identifies related stakeholders, related processes and projects, technologies and infrastructures, actions, solutions and outcomes and 4) Prioritizing issues to create a task list and strategic roadmap. This process helps in creating strategy and direction in the Discover phase of the double diamond.

Mess Mapping™ more complex, wicked problems in other words

Mess Mapping™ is a way of making Complexity Mapping to map wicked problems developed by MacroVU(r), Inc. and Strategy Kinetics, LLC (Horn & Weber 2007). Wicked problems are more complex than "normal" complex problems (Head & Alford, 2008). The wicked problem theory began in the 70s by the professors of Berkeley University (Rittel & Webber, 1973). The term was developed as a critique to the simplistic way of viewing how to solve complex contemporary problems. According to Rittel and Webber (1973) wicked problems need to accomplish ten points in order to be a wicked problem like the Table 1 shows. Wicked problems are problems that in a way will always be there like climate change or war on terror. They can always be improved. They are so complex that trying to solve one the team will probably create a new wicked problem (ibid.). If there were a solution it would not be a wicked problem (ibid.). Often the solvers or tamers are called into account, as there will be consequences of the tentatives of trying to solve a wicked problem (ibid.). For this reason, the wicked problems can be tamed but not solved and thus the solution is called as a resolution (Horn & Weber, 2007). It is about trying to find an optimal way of to tame a wicked problem with less negative consequences.

Table 1 'Summary of the ten wicked problem points (Source: Adapted from Rittel & Webber, 1973; Ritchey, 2013; Horn & Weber, 2007)'

POINTS	DEFINITIONS
1.	There is no definite formulation of a wicked problem.
2.	Wicked problems do not have a "final solution" because the resolution can always be improved.
3.	Solutions to wicked problems are not true-or-false, but good or bad.
4.	There is neither final test nor an immediate solution to a wicked problem.
5.	Each solution to a wicked problem is a "one-time operation" and each attempt counts significantly.
6.	Wicked problems do not have enumerable sets of potential (or exhaustively descriptive) solutions.
7.	Each wicked problem is essentially unique.
8.	Each wicked problem can be considered a symptom of another problem.
9.	The existence of discrepancies in the representation of a wicked problem can be explained in several ways. Choosing an explanation determines the nature of problem resolution.
10.	The planner has no right to be wrong because there are consequences.

Mess Mapping™ is a holistic way of listening and taking into account the stakeholders that are involved in the process (Horn & Weber, 2007). It is impossible to try to tame wicked problems alone; a team and collaborative work is required (Suoheimo, 2016; Horn & Weber, 2007). Mess Map™ is a tool that maps a wicked problem from a holistic multidisciplinary

perspective (Horn & Weber, 2007).

> *A Mess Mapping™ process is a set of structured group methods for collecting, sharing, organizing and evaluating information regarding a Wicked Problem. A Mess Map™ diagram or mural represents a common mental model of the problem at hand that shows the important "chunks" of information and their relationships with other "chunks." (Horn & Weber 2007, p.9)*

The map as the word says may look messy like seen in the Figure 2, but everything is well labelled and a person that comes and reads the map will be able to understand it and catch what is the scope (ibid.). In a way, it is like many mind maps gathered together. It contains the information of the wicked problem and the stakeholders and organizations involved or connected in the problem (ibid.). This is what makes it complex. By visualizing the clusters of problems and their relations can aid in understanding the wicked problem (ibid.). The role of a designer here is essential to create images and visual links to help in understanding and reading the map (Suoheimo, 2016). Like the Horn and Weber (2007) use the word finding and feeling the "pain" is similar to service design (Rontti 2016). In service design projects there are sought for pain points in order to transform them into opportunities (Ibid.).

To open the information of a Mess Map™ a Resolution Mapping™ is used for it. The same institutes develop it as the Mess Map™. The Resolution Mapping™ uses the information from the Mess Map™ to create events that take to a desired end state. It is a form of storytelling what the end state should look like and how one will reach it. (Horn & Weber, 2007)

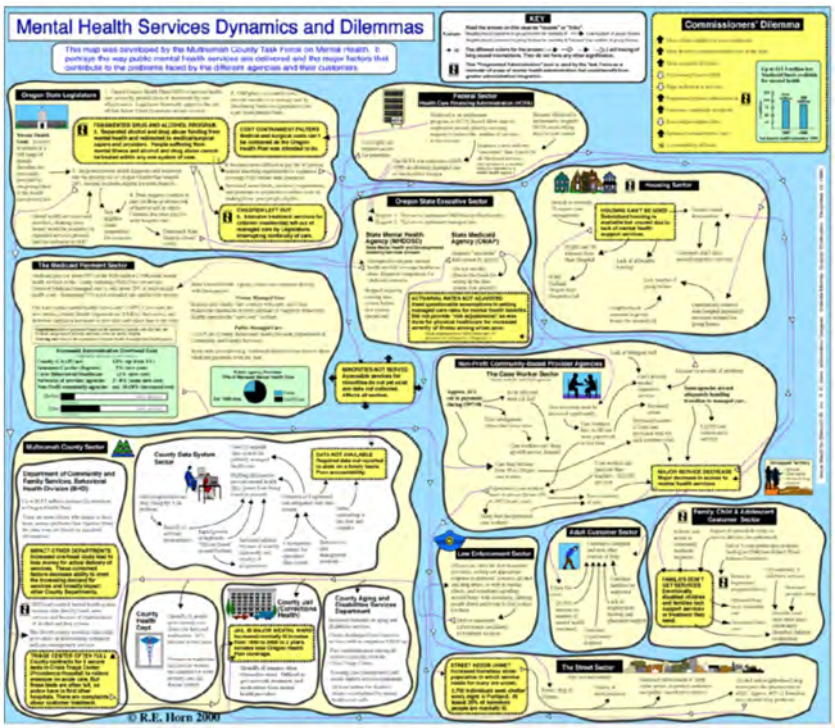

Figure 3 'Example of a Mess Map - Dilemmas in the Mental Health Service (Source: Horn; Weber 2007, p. 13)'

Mess Mapping™ Mobility as a Service

Mobility as a Service can be a very wicked design problem. Interestingly the first authors to define wicked problems were a professor of city planning and of the science of design (Rittel & Webber, 1973). City planning includes mobility and transportation services. We can see too how design and city planning have in common with wicked problems. Buchanan

(1992) already in the 1990's also wrote how the design has evolved in solving complex modern day wicked problems. Head and Alford (2008) have written an article about public management and see the relation of wicked problems in that field. Also Ritchey (2013) writes about how wicked problems are social. Mobility or transportation planning need public policy management and social issues are included like transporting different groups of people and their specific needs.

Mess Mapping™ like Complexity Mapping is used to understand a problem at hand to draw conclusions and future scenarios of what are the best options what to do (Horn & Weber, 2007). They are tools to aid strategic planning. In this specific case, the Mess Mapping™ tool is being used to understand the wickedness of the transportation system in Lapland when creating an application in the province. Complexity rises when more stakeholders are involved (Head & Alford 2008). For example in this case of making Mobility as a Service holistically it should involve participants from the logistics, city authorities from different municipalities, tourist agencies, post office personnel, universities, VTT (Technical Research Centre of Finland Ltd) or any related in the field. The areas covered should be as some examples: tourist transportation, city transportation, moving people and packets, local and provincial commuting, traffic by call as taxis, air traffic, hospital rides provided by the Finnish Social Insurance Institution, payment services… etc. The future technology should not be forgotten either in the process as today there could be created the platform for seaming less customer journeys that may benefit from the automation of cars for example. Mess Mapping™ tool is used here to grasp the pain points and how to transform them if possible to opportunities.

There should also be a strong focus on how to create circular economy in the application of transportation- and Maas services. How can all these entities see where they are placed and the important role they play in it, is through this map. Creating connections how the things relate will help also the companies in the province to keep up with the coming changes and not to drop out, innovate with their services as an example. For example it is probable that the logistics or mail delivering companies can see the transferring packages through ride share as a thread for their business. This can be inverted so that they can become a packet ride share provider together with the people ride shares in the future or maybe have connections with other companies providing these services, become partners instead of competing?

Getting people around a table making a Mess Map™ is a way of registering the dialogues held and the issues that rise. It is a way of democratizing the participants' voices, since once a thing is said and registered in the map, it doesn't need to be repeated again. Everyone will get their voice heard and this also requires preparing and management from the facilitating party. On the other hand the map also works as a benchmarking tool as there can be described innovative services that could be adapted into local conditions and needs, and later implemented by the participating stakeholders. When the map is ready it also can be used, as a form of a checklist of the important issues that needs to begin to be treated that the defined goals could be achieved. It is not in vein that the Mess Map™ is used together with Resolution Mapping™ that is to create future scenarios.

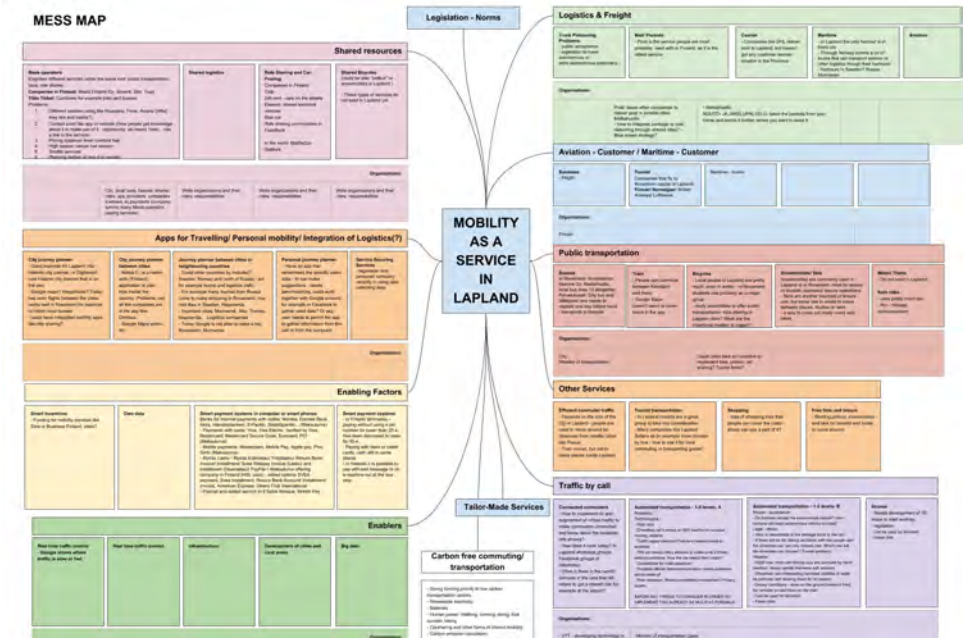

Figure 4 'Mess Mapping™ draft for the process of creating an application of the Mobility as a Service in Lapland, illustrated by Mari Suoheimo'

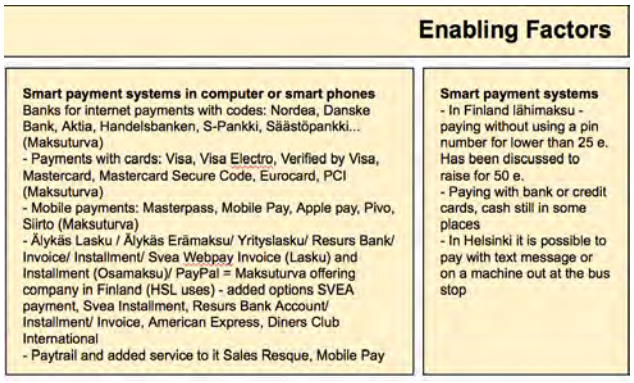

Figure 5 'Detail of a small part of the Mess Map™,

Faculty of Industrial Design in the University of Lapland has taken Mobility as a service together with the future possibilities of autonomous driving as a centre theme. There are several funding applications and sectors of mobility being covered. Mess Mapping™ the different areas are a way to see where stakeholders are in and where the participative companies or institutions see themselves. Also, the planning of a bigger service like a Lapland wide application that covers the transportation of goods or people will benefit from this kind of mapping as it helps to understand what are the underlying problems or areas need to be covered. There has been applied Sitra (Finnish Innovation Fund) funding for this and it seems to get through. They had a specific call in this year to promote circular economy in Maas development in Finland.

In the Mess Map™ in the Figure 4 was used an image of the Finnish Ministry of Transport and Communications (Finnish Ministry of Transport & Communications, 2016 apud Sharp, 2017) as a base for the themes. There are still more things than what the ministry's plan has like the organizations that are in each context. Seeing in practice where each stakeholder and organization is located will help in drawing a more conclusive service and its commitment. This Figure 4 is a rough study and it is still under construction. It has been filled already by the parts that there has been made in the courses of advanced service projects in Mobility as a Service planning at the university. When the map is more developed, it will need a hand from a graphic designer to put images and make it easier to comprehend with colours and shapes as an example.

Analysing Complexity Mapping™ versus Mess Mapping™

Complexity Mapping™ and Mess Mapping™ have similarities. They both try to create understanding of a current situation, problem at stake. In the Double Diamond process, they both are at the first diamond phase like the Figure 5 illustrates. This part is important in a service design process as it creates a shared understanding of what is being processed. Mess Map™ is little more multibranched and complex than a Complexity Map. In the case of a wicked problem, it is harder to create knowledge, as the problem is more complex and wicked. A Mess Map™ is made with this aim to try to create shared understanding of a wicked issue. The way that the stakeholders define the problem will influence also to the outcome of the resolution especially in the wicked problems (Rittel & Webber, 1973).

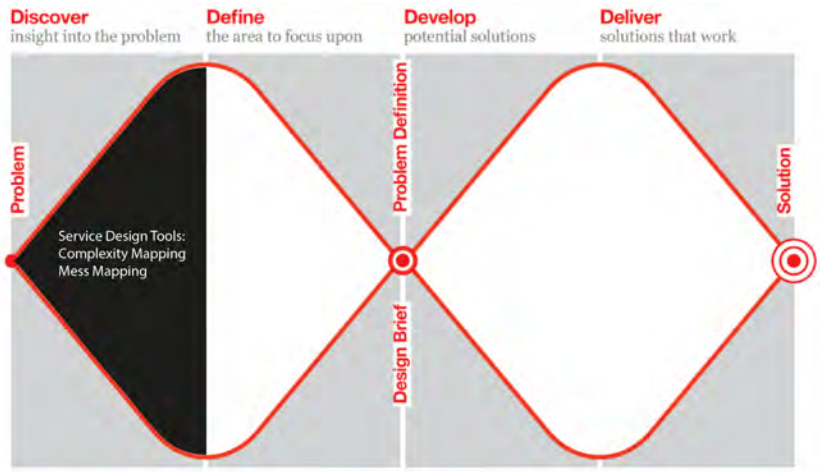

Figure 5 'Place of the Mess Mapping and Complexity Mapping in the Double Diamond (Source: The Design Process: What is the Double Diamond?, 2015)'

The Table 2 illustrates the points that are similar to Qualitative- and Quantitative Complexity Mapping and Mess Mapping™. Qualitative Complexity Mapping has more things in common with Mess Mapping™ than Quantitative. Both are participative, holistic and handmade often at the first stage at least. Afterwards, they can be computerized. Both when having a user- and stakeholder focus can create more commitment to the team solving and thus better implementation. All of them are created to understand complex problems and Mess Mapping™ wicked problems too. Even the Mess Map™ was created with wicked problems in mind; it can still work for complex situations too. Why not?

Table 2 'Analysing Complexity mapping versus Mess mapping'

	Qualitative Complexity Mapping	Quantitative Complexity Mapping	Mess Mapping
Participatory method	x		x
Handmade	x		x
Computerized	x	x	x
Computerized analysing big data		x	
Needs or benefits from better graphical illustration	x	x	x
Holistic	x	(?)	x
Made to understand complex problems	x	x	x
Made to understand wicked problems			x
Benefits from service designer mediating the process	x	x	x

Quantitative Complexity Mapping is different in the sense that it analyses big data. In this kind of procedure, more people are not required as the computer gathers and handles the information. This is why it is not that participative. It is little obscure if it is holistic or not. It can gather data holistically but is difficult to have a holistic group if it does not require

people in its process. On the other hand, there can be a holistic group that creates the parameters of information that the computer will gather. Big data gathering and its analysis could be added also to Mess Maps™ and Complexity Mapping. All the three maps benefit from a good visual presentation and thus needs designers or artists in its creation. This helps in better understanding of the maps and the connections between the things mapped. Also, all the three kinds of maps benefit from a service designer mediating the process thinking the systems of transportation or Mobility as a Service.

There are some tools to use together with Complexity Mapping and Mess Mapping™ to take the next strategic steps. Both types of maps can make a good use of design thinking to proceed with future solutions/resolutions and scenarios. Also scenario mapping could work as a complementary tool. Actually, Mess Mapping™ has Resolution Mapping™ designed to use in a sequence that makes future scenarios and uses storytelling as a tool to create comprehension of what the ideal scenarios should look like. Road Mapping is also an excellent tool for future steps of a complex and maybe for a wicked problem too, so it could be used in both cases of mapping, wicked and complex. Analysing the two cases illustrated here the Complexity Mapping works better when there is a case defined before hand and the Mess Mapping™ works as a tool to define what the case could be.

Discussion

Strategic decision making in order to take future steps needs this kind of understanding of mapping first, to define what is the problem. Complexity Mapping and Mess Mapping™ can be seen as strategic tools as they aid in decision-making. Design Thinking, Road Mapping or Resolution Mapping™ are tools that can begin to open these complex maps, to understand them, and how to take the next step. The case made with the large manufacturer and European city in question showed how the service design processes through Qualitative Complexity Mapping can make complex situations more manageable. These processes help the team management to make smarter decisions in transportation services and create commitment. Smarter in the sense that the problem in question is more familiar through the use of the tools and know what to take into consideration. It does not mean that the problem itself becomes simpler, but more understandable. This way the Complexity Mapping and Mess Mapping™ are tools to make strategic decisions of future planning.

Quantitative method will be interesting to use in the context of the Mobility as a Service too. It can understand big data, which is valid to map for example how the traffic flows in a city and how to allocate resources more wisely. Future smart roads will be gathering this data more too in near future. This is important in the sense of coming of autonomous driving. There still needs to make real-life experiments to see whether the Quantitative Complexity Mapping can or is participative and holistic. As written before it could be holistic if there is a holistic team or a setting at least how it gathers data. As the Quantitative Complexity Mapping doesn't necessarily rely on people, it may fail in creating commitment of a larger team. This may lead in not that successful end as one that creates commitment. On one hand, it can be more “simplistic” in its setting as it can complement the other two kinds of mapping strategies. This article suggests future studies of Quantitative Mapping and how to elaborate it in a holistic and participative direction. Also another perspective is to study how it can complement the other two kinds of mapping processes in the development of transportation and Maas services.

The case in this article of Mess Mapping™ Mobility as a Service is still being elaborated. It could benefit from mixed methods. For example, using the big data collected by computers in transportation services can help creating understanding in new ways. There are sensors in the roads and in the cars that can gather information too, let alone all the open data that there is already available online within a hand’s reach.

Designers play a vital role in mapping, managing and visualizing these contemporary complex and wicked problems. It also requires empathy and humility to be able to construct what is the information around with all the stakeholders involved. Service designers have the tools to listening and practicing empathy and this needs humility. It is known that artists and designers have this ability of sensibility and also due to their training to see things that others may have forgotten or not capable to give a proper value. Service design is about putting the users in the centre and this is what helps in a successful implementation of a

public-private partnerships and/or collaborations with multiple stakeholders strategy in transportation. To take into account the needs of a final user makes that the whole process will not go of the track. This is a way of creating also commitment with the transportation strategy let alone of the perspective of having the most important stakeholders in the process. A successful implementation is what gives the best return of investment for the entities that began the process at the first stage.

The capability to see the connections in mapping is important to create shared understanding and prioritize what are the critical points that can be turned into opportunities. This is a way to aid in scaling up the services or even manufacturing processes. Future studies are recommended to investigate how these three kinds of mapping could complement each other. For example how Mess Mapping™ could gain more valid information from a Quantitative Complexity Map like in the case of the Mobility as a Service in Lapland, Finland.

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